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Sea manning shortfalls have plagued the Navy over the latter part of the 1990s—with E4-E9 sea manning dropping below 90 percent for much of that time. The Navy considered two general solutions; ordering sailors to sea for longer or offering incentives for sailors to volunteer for additional sea duty. Although the assignment to sea duty is involuntary, the length sailors actually serve reflects both their sea duty obligation and their willingness to serve at sea. As we will document here, many sailors do not complete their sea tours, so lengthening sea tours may not be an effective way to improve manning. A recent CNA study used survey data to predict how sailors would respond if the Navy were to restructure sea pay, which is the Navy's primary distribution tool. In this annotated briefing, we look at historical data on the average time sailors spend at sea and relate them to changes in sea pay. Survey and anecdotal evidence exist, but little direct evidence links sea pay and time spent at sea. These data provide additional empirical evidence on sailors' response to sea duty incentives and the groundwork for a more detailed study in the future. *In addition, as the Navy reforms sea pay, it will need to monitor the system and change sea pay rates when necessary. The measures we present here may provide a basis for evaluating the effectiveness of the reform.*

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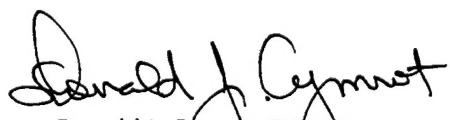
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Sea Tours and Sea Pay: Patterns in Sailors' Completion and Extension of Sea Duty

Heidi L. W. Golding

David Gregory



Sea manning shortfalls have plagued the Navy over the latter part of the 1990s—with E4-E9 sea manning dropping below 90 percent for much of that time. The Navy considered two general solutions: ordering Sailors to sea for longer or offering incentives for Sailors to volunteer for additional sea duty. Although the assignment to sea duty is involuntary, the length Sailors actually serve reflects both their sea duty obligation *and* their willingness to serve at sea. As we will document here, many Sailors do not complete their sea tours, so lengthening sea tours may not be an effective way to improve manning. A recent CNA study used survey data to predict how Sailors would respond if the Navy were to restructure sea pay, which is the Navy's primary distribution tool.¹

In this annotated briefing, we look at historical data on the average time Sailors spend at sea and relate them to changes in sea pay. Survey and anecdotal evidence exist, but little direct evidence links sea pay and time spent at sea. These data provide additional empirical evidence on Sailors' response to sea duty incentives and the groundwork for a more detailed study in the future. In addition, as the Navy reforms sea pay, it will need to monitor the system and change sea pay rates when necessary. The measures we present here may provide a basis for evaluating the effectiveness of the reform.

¹ The analyses are detailed in Golding and Griffis, *Options for Sea Pay Reform* (CNA Annotated Briefing 98-43), and in Golding and Griffis, *Analysis of Proposed Sea Tour Extension Program* (CNA Annotated Briefing 98-129).

Questions

- How long do Sailors actually spend on sea duty?
- Does sea pay influence Sailors' time spent at sea?

Fundamental issue:
Does compensation change
behavior?

The Navy distribution system relies on compulsory sea duty assignments for defined prescribed sea tour lengths (PSTs). PSTs range from 3 to 5 years depending on the paygrade and rating of the Sailors. When sea manning in a rating or NEC is low, the Navy may extend Sailors' PSTs and, when manning is high, may shorten the PSTs. Sailors, under the current system, are given limited choices regarding the billet and are often ordered into jobs that don't suit their preferences. Sea pay is then paid to certain Sailors to "restore equity" for the hardship of that duty.

In this document, we first provide summary information on sea pay and Sailors' time spent on sea duty to give insight into the success of the distribution system and sea pay. If the Navy's systems were successful, we might expect Sailors to fulfill their obligated tours. However, if Sailors dislike sea duty on the whole and sea pay is not enough to compensate them, the Navy may have difficulty keeping Sailors at sea and, ultimately, in the Navy.

Once we've looked at the present situation, we examine historical data on Sailors' time at sea and correlate these data to changes in the value of sea pay. We do this to test whether sea pay has provided some incentive to stay at sea.

What We Examine

- Completion rates of obligated sea tours (PST)
 - Sea pay might or might not influence
- Extension rates past PST
 - Voluntary behavior that sea pay should influence
- Changes in completion and extension rates as the value of sea pay has changed over time

The best way to measure whether, and how much, sea pay influences a Sailor's willingness to be on sea duty would be to look at how long a Sailor would *choose* to be on sea duty before and after changes in the value of sea pay. Because the Navy mandates the time a Sailor is to serve on sea duty with the PST, Sailors' time at sea may reflect their obligations rather than their preferences for sea duty or responsiveness to sea pay.

To draw out information on the willingness of Sailors to stay at sea and sea pay, we separate time at sea into two categories: 1) the completion of obligated sea service and 2) any additional time the Sailor spends above and beyond the obligated service at sea.

We examine PST completion rates because they tell us whether the Navy is getting the sea time it expects from individual Sailors. In addition, although the PST is an obligation and PST completion may not reflect voluntary behavior, the noncompletion of PSTs tells us something about Sailors' willingness to stay at sea. Changes in noncompletion rates in the face of sea pay changes partially reflect how much compensation can affect behavior. We measure noncompletion of sea tours as Sailors who leave their sea tours at least 6 months before the end of their PSTs.

It is our second measure, the extension of sea duty beyond PST, that more fully reflects a person's willingness to stay at sea because it is duty for which the Sailor volunteered. We compare changes in sea pay against changes in extension rates. To the extent, however, that Navy policies may not encourage, or may even reject, requests for extensions, any increases in voluntary extensions associated with an increase in sea pay may understate the willingness of Sailors to extend.

Two Sea Pays

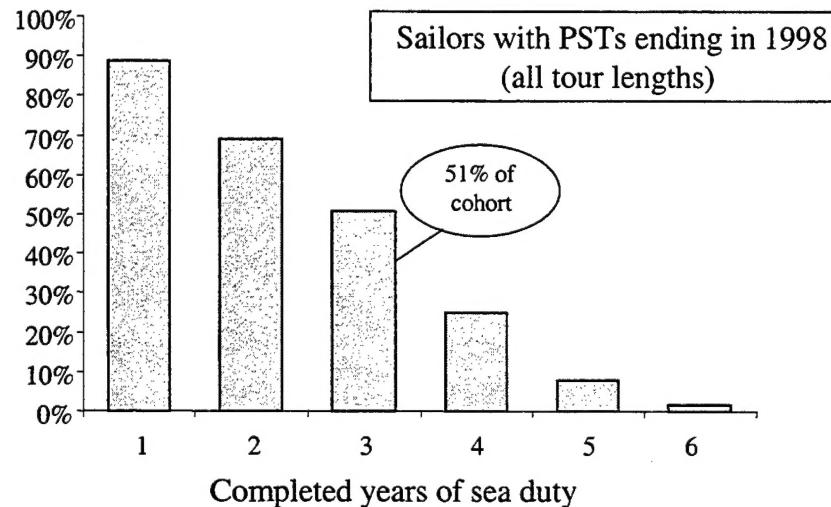
- Purpose of sea pay
 - Compensate for hardship
 - Keep Sailors at sea
 - Encourage Sailors to reenlist into sea duty
- Career Sea Pay (CSP)
 - Paid to all E4-E9s serving on ships and submarines
 - Amount based on cumulative years of sea duty and grade
- Sea Pay Premium (SPP)
 - \$100 per month after 36 consecutive months
 - Eligibility has changed over time

Traditionally, the Navy has argued that sea pay is a means to compensate Sailors for the unique hardships of serving on ship. In addition, however, sea pay is the Navy's primary distribution tool to get Sailors to go to sea, stay at sea, and reenlist into sea duty.

So, how does the Navy pay sea pay? Career Sea Pay (CSP) is paid to E4-E9 Sailors assigned to a ship or submarine, ship-based staff, or ship-based aviation unit. In general (although there are exceptions), those Sailors serving on ships and submarines for their sea tours receive CSP continuously, whereas Sailors in squadrons or ship-based staffs receive CSP only when deployed. Sailors on shore tours who receive sea duty credit cannot receive CSP. For Sailors eligible for CSP, the monthly rate rises as the Sailor's cumulative sea duty and paygrade increase. Currently, pay varies from \$50 to \$520 per month.

Sailors entitled to CSP may also receive a Sea Pay Premium (SPP) of \$100 per month after 36 consecutive months at sea. Sailors in paygrades E5 and above with more than 5 years of cumulative sea duty are not eligible for SPP.

How Long Do Sailors Serve at Sea?



Here, we examine the cohort of Sailors with PSTs ending in 1998. The chart shows the distribution of years of sea duty they completed.² We see that Sailors leave sea duty early in their tours—only 70 percent complete 2 years. By 3 years, only one-half of Sailors are still serving on their tours. The steepest yearly decline, however, is in the fourth year of sea duty, when more than one-third of Sailors leave their sea billets. This drop largely occurs because (a) 36-month tours end, and (b) Sailors leave the Navy. Some Sailors, about 8 percent, did spend more than 5 years on sea duty (the maximum sea tour length), but most of those Sailors left sea duty before 6 years.

² Only sea tours with continuous sea pay eligibility are included.

Factors That Affect Duration of Time at Sea

- Incentives for sea duty
 - Sea pay
 - Quality of service life at sea
 - Other pay
- PST and changes in PST/PRD
 - Manning
 - PCS funds
 - Drawdown
 - Decommissioning ships
 - Navy policies (reenlistment, ease in extending)
- Personal (e.g., family situation, medical)

This briefing looks at aggregate correlations between time on sea duty and sea pay. Other factors, besides sea pay, influence the time Sailors spend on sea duty. Working conditions, changes in PST, other compensation offered during sea duty, and personal situations may all affect the actual time Sailors serve aboard ship.

In addition, Navy policies and funding have affected Sailors' time at sea—shortening it in some cases, lengthening it in others. Two notable examples of policies that shortened sea time occurred before the undermanning problems surfaced. The first, widespread in the mid- and late-1980s, was the waiving of Sailors' sea duty obligation past the first term as a means to encourage reenlistments. The other example is the drawdown, during which many ships were decommissioned. Crews on ships being decommissioned were either rotated to other ships or allowed to rotate to shore early. On the flip side, Navy underfunding of the PCS account in the mid-1990s forced some delays in Sailors rotating to shore.

Because we do not hold these other factors constant, the changes in time spent on sea duty that we observe over the 1990s may be partly attributable to these other influences.

We Focus on Sea Pay Changes

- Sea pay last changed in FY88/89
 - Sea pay table increased up to \$130, but careerists' eligibility for \$100 SPP was eliminated
 - Sea pay table decreased slightly for junior enlisted
- Sea pay lost 40% of value since FY89

The last major change to the Career Sea Pay tables was in FY88/89. The Navy restructured the sea pay table to reward Sailors with sea-intensive careers. CSP rates ratcheted up after 5 years of cumulative sea duty, although the loss of the Sea Pay Premium eligibility partially offset the sea pay table increase. Overall, pay increased for careerists and first-term Sailors with long sea tours, providing additional incentives for them to extend.

Since the pay table change in FY89, inflation has eroded the value of sea pay significantly. Consequently, the incentive value of sea pay has declined. We expect that both careerists and first-termers would have become less likely to complete and extend at sea over the 1990s.

The Navy is currently trying to restore the incentive value of sea pay by increasing and restructuring sea pay. The sea pay reform package targets CSP toward first-term Sailors at EAOS to provide additional incentives for the first-term Sailor to complete and to extend on sea duty.

Sea Tours Examined

- Eligible for *continuous* sea pay
 - Excludes Sailors in squadrons and other activities paid sea pay only when deployed
- Started since FY83 and completed by FY00
- E1 through E9: men only
- OCONUS/CONUS rotations excluded

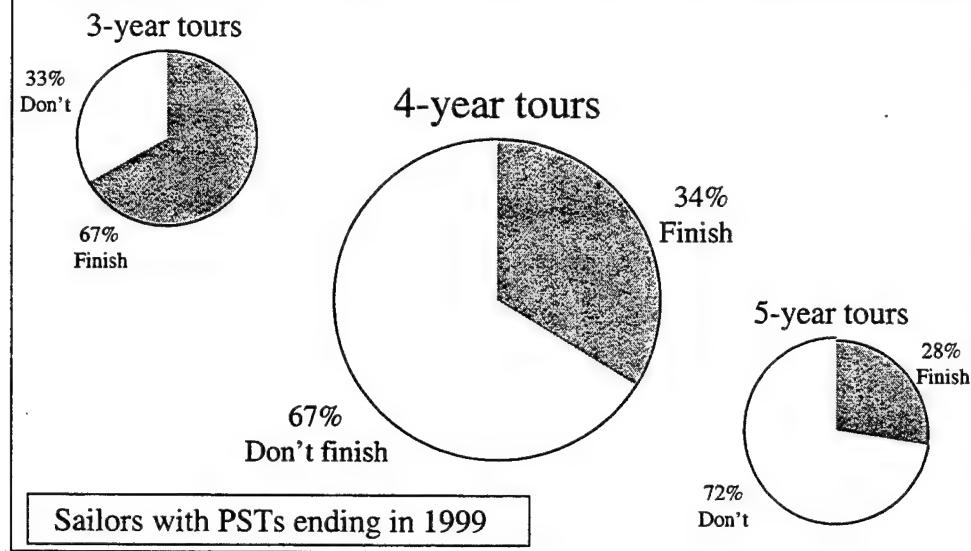
Over 600,000 sea tours in total

Our primary focus is on sea tours for which Sailors are eligible to receive sea pay throughout the entire tour (e.g., category A sea tours). As sea pay varies, these Sailors face the largest changes in incentives and, consequently, should have the strongest response.

Our data file includes tours that started in FY83 or later and that ended by December 1999. Our sample includes all paygrades because most Sailors would become eligible for sea pay by the end of their sea tours. We limited our analysis to men. The time frame that we study includes many changes in women's assignments, and incorporating that into this analysis is outside the scope of this project. We also exclude OCONUS/CONUS rotations.

These conditions result in a dataset of over 600,000 sea tours.

Most Sailors Do Not Complete Their PSTs

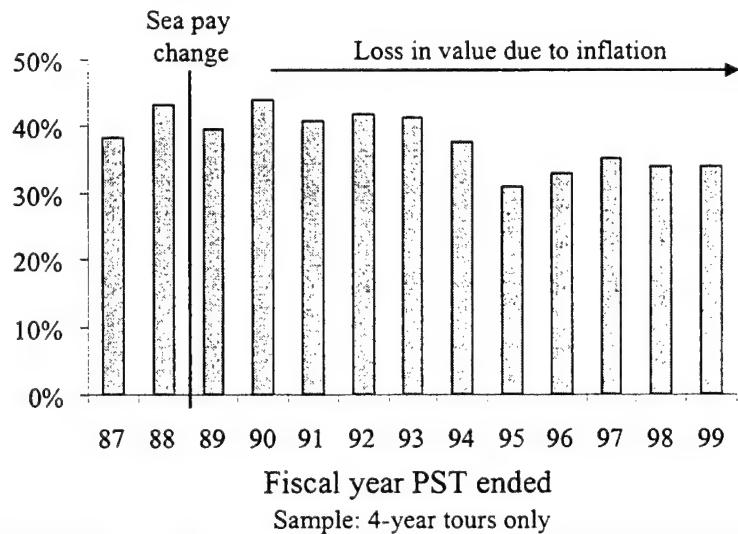


How did we determine whether a Sailor fulfilled the obligated sea duty? We used published PSTs from the early 1980s to the present and matched the PST to the Sailor by rating/skill and paygrade. For sea tours that changed PST, we used the published phase-in to obtain a new PST for the individual. If the Sailors' time on sea duty (excluding training or other interruptions) was within 6 months of PST, we considered them to have completed their sea tours.

We found that 4-year tours represent the largest category of tours. About one-half of all PSTs ending in FY99 are 4 years in length. The next largest category is 5-year tours (25 percent of sea tours), followed by shorter tour lengths.

Only for the short sea tours do most Sailors complete their sea tours. Completion rates for PSTs of 3.5 and 4.5 years (not shown here) are 62 percent and 38 percent, respectively. Overall, about two-thirds of all Sailors do not complete their PSTs. Some rotate to shore duty early, but the primary reason they do not finish their sea tours is because they leave the Navy.

But Completion Rates Peaked With Sea Pay Changes



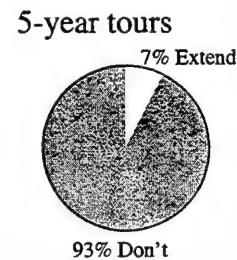
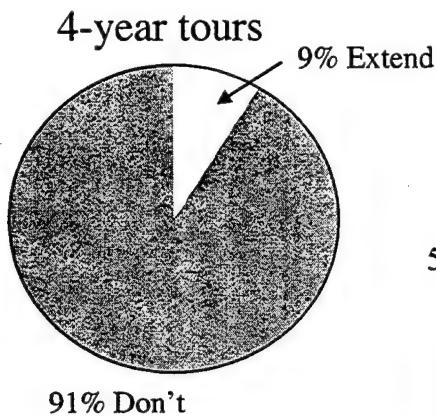
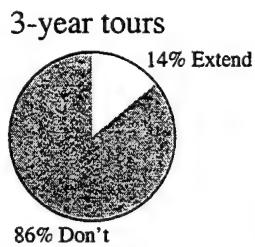
What has happened over time? The last sea pay increase corresponds to the highest completion rates the Navy has experienced in the last decade. Since the revision, completion rates have dropped about 20 percent overall for Sailors serving 4-year tours.

This decline does reflect, however, the influence of other factors besides the effects of the sea pay devaluation on Sailors' completion of sea tour obligations. For example, Sailors who rotated to shore duty more than 6 months early because of ship decommissionings show up in our data as not having completed their PSTs. Decommissionings in the first half of the 1990s eliminated over 60,000 billets (three times more than the latter portion of the decade). The result is that our completion rates, particularly in the early portion of the decade, are lower than they would have been. We estimate that completion rates could have been about 3 percentage points higher in the early 1990s if the Navy policy had not been in place. The drop in completion rates would then be about 25 percent.

Other Navy policies, such as waiving sea duty for sailors reenlisting or extending sea duty because of PCS funding, tend to reduce or extend sea duty by less than 6 months. Because we consider Sailors who served all but 6 months of their PST as having completed their sea tours, the rates we calculated are largely unaffected by these policies.

Although we do not show it here, the patterns are similar for Sailors with other PST lengths. The declines are smaller, however, for Sailors with both shorter and longer PSTs.

Some Sailors Do Extend Past PST

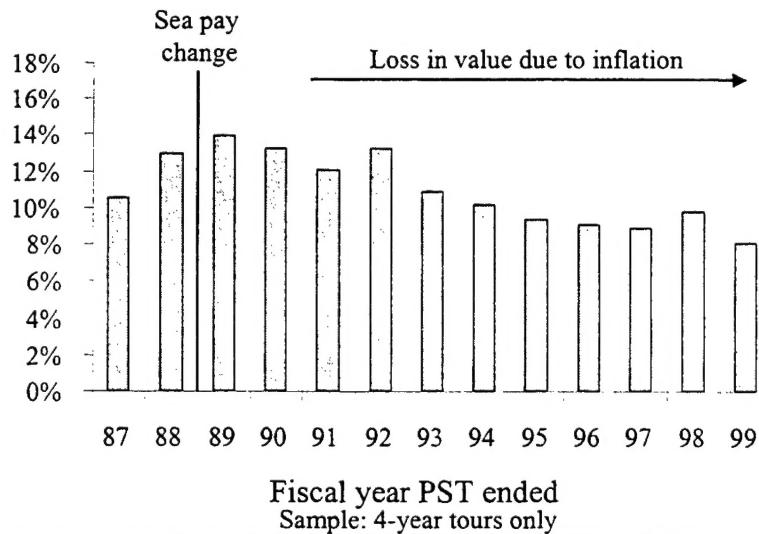


Sailors with PSTs ending in 1998

In this slide, we show how many Sailors volunteer to serve additional time at sea beyond their obligation. Of the Sailors *completing* 4-year sea tours, over 25 percent voluntarily extend their sea tours—even without any additional incentives.

We use a conservative measure to define an extension of sea duty—Sailors staying on sea duty at least 6 months following the end of the PST. We do this to have a lower bound on the level of extensions. This does mean, however, that we probably underestimate the number of extensions.

Voluntary Extensions Also Peaked with Sea Pay Changes



Voluntary extensions of sea duty appear highly correlated to sea pay. Extensions for Sailors on 4-year sea tours peaked in FY89—when the full sea pay changes took effect. Just under 14 percent of Sailors with sea tours that should have ended in FY89 served additional time at sea. Extensions have declined ever since, as sea pay has lost 40 percent of its value to inflation. Under 8 percent of Sailors extended at sea in FY99—a decline of almost 50 percent. We see similar trends for Sailors with both shorter and longer PSTs.

Additional Findings

- Trends in sea duty similar for both first-termers and careerists
 - Exception: larger decrease in completion rates for first-termers since the FY89 sea pay change
- Completion and extension rates stable for category B sea tours
 - Sea pay expected to have little effect on these tours

Both careerists' and first-termers' completion and extension rates have followed the same pattern. Rates peaked with the last sea pay revision and decreased over the 1990s. However, the declines in completion rates were substantially greater for first-termers, and the declines in extension rates were larger for careerists.

Finally, we looked at the time that Sailors in category B sea tours spent on sea duty. These Sailors do not experience the typical rigors of sea duty and consequently only receive sea pay when deployed. Overall, they have somewhat higher completion and extension rates than Sailors on sea tours who qualify for continuous sea pay. Because Sailors on category B sea tours do receive sea pay during deployments, sea pay may have some power to induce category B Sailors to extend for an additional deployment. It is unlikely, however, that such infrequent receipt of sea pay would have a large effect on completion rates. And this is what we see. Similar to category A sea tours, extension rates did drop substantially during the 1990s as sea pay dropped in value. In contrast to category A sea tours, however, completion rates for Sailors on category B sea tours were stable, if not increasing, through the 1990s.

Interpretation

- Sea pay can affect a Sailor's willingness to complete and extend on sea duty
- Monitoring time-at-sea changes captures effectiveness of sea pay
 - Difficulties in calculating
 - Navy policies may muddy picture

We've followed Sailors through their sea tours and calculated whether they complete or extend their sea tours based on published Navy PSTs. Our results suggest that sea pay significantly influences an individual's time at sea. For Sailors serving 4-year tours, a 40-percent reduction in value of sea pay corresponded to a 20-percent decrease in the fraction of Sailors who complete their sea tours. In addition, it also corresponded to a reduction in Sailors' extensions of over 40 percent for the same period. In this brief analysis, however, we have not controlled for other determinants of sea tour extensions and completions, so the results should be interpreted with caution.

As part of sea pay reform, the Navy plans to monitor the effectiveness of the pay increases. Although they require substantial data input and programming, the metrics we have developed here may be useful to the Navy as it monitors the success of sea pay.

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